REMARKS

This Amendment "B" is submitted in response to the non-final Office Action mailed February 4, 2005, as corrected by the Office Action mailed February 18, 2005, wherein claims 1 and 23 were rejected and claims 2 – 22 were allowed. By this amendment applicant has amended rejected claims 1 and 23. Claims 1 – 23 remain pending. Reexamination and reconsideration of claims 1 and 23 in view of the foregoing amendments and following remarks are respectfully requested.

Allowed Claims

Applicant appreciates the favorable consideration and allowance of claims 2 – 22. No further discussion or amendment of these claims is required.

Claim Amendments

Claims 1 and 23 have been amended to add a step of, "applying an encapsulation material that covers the bonding wires and forms a cavity around at least a portion of the sensor array that minimizes an inaccessible portion of the sensor array." This language is substantially identical to the language used in claim 1 of the parent application, now U.S. Pat. No. 6,653,723.

Claim 23 has been also amended to recite that wirebonding is repeated to form a plurality of connections. The language added to claim 23 is substantially identical to language in claim 1.

Traversal of Rejections

Claims 1 and 23 have been amended to recite a step of applying an encapsulation material that covers the bonding wires and forms a cavity around at least a portion of the sensor array that minimizes an inaccessible portion of the sensor array. This step is not suggested in either Nguyen or Chiu and, therefore, is not obvious in view of the prior art relied upon by the examiner. Specifically, neither Nguyen nor Chiu makes any mention of encapsulating bonding wires, and further, neither makes any mention of forming a cavity around at least a portion of a fingerprint sensor using an encapsulant.

Claims 1 and 23 were rejected as being obvious under 35 U.S.C. § 103 over Nguyen et al., U.S. Pat. No. 6,655,854 ("Nguyen") in view of Chiu, U.S. Pat. No. 6,686,546 ("Chiu"). Nguyen is said to teach the use of a method similar to that which is recited in claims 1 and 23 in

the context of an "optoelectronic sensor." Chiu is said to teach "an optical device which is a finger sensor." The examiner asserts that it would have been obvious "that the configuration would be similar for a variety of electronic devices and optical sensors and that a finger sensor is a type of optoelectronic device." Applicant respectfully disagrees for the reasons discussed below.

In the Office Action, the examiner states, "Chiu teaches an optical device ..." and that a "finger sensor is a type of optoelectronic device." Applicant respectfully disagrees. The fingerprint sensor described in Chiu is not an "optical device." Applicant respectfully submits that the term "optical device" (sometimes referred to as a "photonic device") means a device which transmits, receives or otherwise conveys **optical signals.** The word "optical" appears only in the "background" section of the Chiu patent to describe relatively old prior art fingerprint sensing systems. The "bulky" prior art optical fingerprint systems described Chiu do not appear to be chip-based systems. Chiu then goes on to discuss capacitive (*i.e.,* non-optical) fingerprint sensors, and the Chiu patent is directed to an improved capacitive sensor comprising a conductive grid used to dissipate static electricity from the user's finger. Like Chiu, the present application has nothing to do with optical sensing, but instead refers to capacitive fingerprint sensors.

The fact that Chiu is completely unrelated to photonic (optical) devices, of the type disclosed in the primary reference Nguyen, negates any motivation to combine the references. Simply put, there is no reason shown why someone of ordinary skill in the art would be motivated to combine these references. Given the very substantial differences in the design principles for photonic devices vs. fingerprint sensors, it is very clear that one of ordinary skill in the art would not look to the photonic coupling invention of Nguyen to solve problems in the field of fingerprint sensing that are wholly unrelated to optical coupling.

It is important to understand that there is a very significant difference between the size of the photonic devices disclosed in Nguyen, and fingerprint sensors. As disclosed in FIGS. 1, 2 and 3 of Nguyen, photonic device 110 appear to be of the same scale as the core of an optical fiber. Typically, a multimode optical fiber has a core diameter on the order of 100 microns (*i.e.,* one-tenth of a millimeter) or less, and single mode optical fibers have much smaller core diameters. On the other hand, the fingerprint sensing devices of the present invention are large enough to accommodate a human finger – on the order of two centimeters. Thus, fingerprint

sensors inherently appear to be roughly 200 times (or more) larger than the photonic devices depicted in Nguyen. While it is understood that Nguyen's figures may not be drawn precisely to scale, the size difference is clearly very substantial. In view of this vast difference in size, there is no reason why someone of ordinary skill in the art would look to the photonic devices of Nguyen for the design of a fingerprint sensor.

Contrary to the examiner's assertion, Nguyen does not disclose an "optoelectronic sensor" as that term is understood by persons of ordinary skill in the art. Nguyen is concerning with optical coupling, not optical sensing. Specifically, the Nguyen patent discloses a structure for coupling a photonic device with an optical fiber. Neither "sense" nor "sensor" appears anywhere in the patent. Again, the fact that Nguyen is unrelated to sensing further undermines the assertion that it is relevant to the art of capacitive fingerprint sensors.

Nguyen discloses a method of precisely spacing one or more photonic devices formed on a "chip" and a corresponding number of optical fibers to obtain good, reproducible coupling of optical signals. To achieve this result, Nguyen discloses the use of one or more "dam" structures having a precisely controlled height to obtain the desired spacing between the adjacent components. In order to reduce the separation distance between the optical fiber and the photonic device, Nguyen describes the use of "a reverse wire bond." Because of the simple nature of the photonic devices described in Nguyen, the patent shows only one wirebond per optical emitter or receiver, (FIGS. 1, 2, 3 and 4). This is a relatively small connection density in comparison to a fingerprint sensor.

In view of the nature of the Nguyen device, there is no reason why anyone would encapsulate the wirebonded connections in the manner specified in amended claims 1 and 23. Unlike a fingerprint sensor, which is designed to be in direct contact with users' fingers, the optical coupling device of Nguyen is meant to be isolated from user access. Nguyen mentions that it is "optional" to "glob top" or encapsulate the device "with transparent material," but that this is unnecessary in most applications. (Col. 7, lines 63 – 66.) While it is not entirely clear what this means, there is no indication that the wirebonds are encapsulated in a way that forms a "cavity" around at least a portion of the "sensor." (As noted, the Nguyen device is not a "sensor.") The term "glob top" normally means that a "glob" of encapsulant in placed over an entire device, such that the device becomes fully embedded within the glob of encapsulant after

curing. The fact that the Nguyen specifies that the encapsulant is "transparent" suggests that it flows into the light path of the device, *i.e.,* no cavity is formed.

Unlike the present invention, Chiu does not disclose the use of wirebonding to connect die contacts associated with an array of cells on a fingerprint sensor to external circuitry. The only disclosure of wirebonding in Chiu is to connect the inventive charge dissipation grid to ground. This grounding function requires, at most, only a very limited number of connections. In contrast to the disclosed wirebonded ground connections, Chiu states: "The active components of the sensor chip 42 may be connected to the printed circuit board 40 by, e.g., ball or solder bonds 52 through a conduit 54 to a pad 56." (Col. 10, lines 1 – 4.) Thus, it appears that Chiu is unconcerned about the problem solved by the present invention, namely, the need to wirebond a large number of sensor pads on a fingerprint sensor while maximizing the usable area of the sensor array.

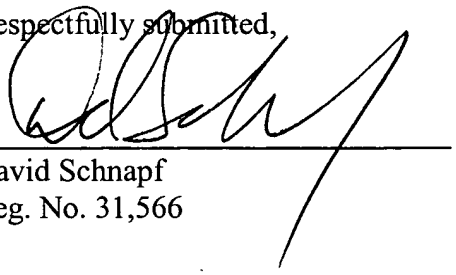
In summary, there is no reason why someone of ordinary skill in the art would have combined the widely different teachings and structures disclosed in the Nguyen and Chiu patents, and even if the teachings were combined they do not disclose the claimed invention.

Conclusion

For the foregoing reasons it is respectfully submitted that claims 1 and 23 are in condition for allowance, and such action is earnestly solicited. The examiner is invited to call the undersigned at the phone number listed below if doing so might advance the prosecution of the application.

March 2, 2005

Respectfully submitted,



David Schnapf
Reg. No. 31,566

SHEPPARD, MULLIN, RICHTER & HAMPTON LLP
Four Embarcadero Center, 17th FL.
San Francisco, CA 94111-4106
(415) 434-9100
(415) 434-3947 (fax)